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EXAMINER

MERCADO, JULIAN A

ART UNIT

PAPER NUMBER

1745

15

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-15

**Office Action Summary**

Applicati n N .

09/623,011

Applicant(s)

LAMM ET AL.

Examiner

Julian A. Mercado

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-- The MAILING DATE of this communicati n appears on the c ver sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 10-17 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 23 and 24 is/are allowed.
- 6) ☐ Claim(s) 10,15,21 and 22 is/are rejected.
- 7) ☒ Claim(s) 11-14,16,17 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

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## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 12, 2003 has been entered.

The rejection of claims 10-17 and 21-23 are rejected under 35 U.S.C. 102(e) based on Hornburg et al. has been withdrawn.

Claims 10-17 and 21-24 are pending, of which claim 24 is newly submitted.

### ***Claim Objections***

Claim 16 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 16 recites "an anode offtake" in lines 1-2, however, this anode offtake is not found mutually exclusive from that which is already recited in independent claim 10 (via the present amendment).

Claim 21 is objected to because of the following informalities: it is suggested to change "adjusting at least one of a flow rate of the liquid coolant/fuel mixture, and pressure in said

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cathode compartment" in line 17-18 to --adjusting at least one of a flow rate of the liquid coolant/fuel mixture or pressure in said cathode compartment--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 21 recites the limitation "the liquid coolant/fuel mixture" in the last line. There is insufficient antecedent basis for this limitation in the claim. It is suggested to change "the liquid coolant/fuel mixture" to --the coolant--.

Claim 22 is rejected under 35 U.S.C. 112, second paragraph as being dependent upon a rejected base claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Van Dine et al. (U.S. Pat. 5,573,866).

The rejection is maintained for the reasons of record and for the additional reasons to follow. A reiteration here follows. Regarding independent claim 10, Van Dine et al. teaches a fuel cell system having an anode compartment [6], a cathode compartment [8], a proton-conducting membrane [4], a cathode feeder [26] for delivering oxygen-containing gas such as air, an anode feeder [18] for delivering a liquid coolant/fuel mixture such as water and methanol, and a pump [20] for pumping the mixture to the anode compartment. (col. 3 line 35 et seq.)

The present amendment to independent claim 10 recites an anode offtake connected to a gas separator. In Van Dine et al., a line [36] is specifically disclosed to duct "water, carbon dioxide, and methanol which may evaporate from the anode chamber". (col. 3 line 65-67) Thus, the line [36] disclosed by Van Dine et al. is deemed both structurally and functionally similar if not identical to applicant's claimed offtake. In a prior Office Action, the condenser unit [32] in Van Dine et al. was set forth as equal to applicant's claimed expander unit. However, in this ground of rejection, the condenser unit [32] in Van Dine et al. is realized to be more closely drawn to applicant's claimed gas separator. Applicant's specification on page 5 line 35 et seq. discloses that the gas separator separates carbon dioxide from the liquid/gas mixture. To this extent, in Van Dine et al. the condenser unit, i.e. gas separator is also specifically disclosed to separate carbon dioxide. (ibid) Thus, the condenser unit [32] is deemed both structurally and functionally identical to the instant gas separator. Additionally, in Van Dine et al. the offtake is similarly connected to the gas separator. (Figure 1)

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The present amendment to independent claim 10 also further recites that no additional heat exchanger is provided in said anode circuit. This negative limitation is understood by the examiner to distinguish the present claims from another prior art reference, that to Hornburg et al. In Van Dine et al., however, no heat exchangers are employed, “[c]ooling of the stack is accomplished without the need of a separate stack cooling loop”. (col. 4 line 35-37)

As to a holding and purification tank, Van Dine et al. teaches a holding tank [30] which, as shown in Figure 1, wholly contains the anode chamber [6] and allows for condensed water and methanol to drain back via drain line [38].

#### ***Allowable Subject Matter***

Claims 11-14 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: while expander units are deemed well-known, the prior art of record and to the examiner’s knowledge do not teach or render obvious at least to the skilled artisan the instant invention regarding an expander unit disposed in the cathode circuit wherein water vapor generated in the cathode compartment is delivered to the expander unit, as recited in dependent claim 11.

The prior rejection of claims 10-17 based on Hornburg et al. has been withdrawn in view of the present amendment to the claims precluding a heat exchanger such as the heat exchanger [31] and [32] employed in Hornburg et al.

Claims 21 and 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office Action.

Claims 23 and 24 are allowed.

The following is an examiner's statement of reasons for allowance: the prior art of record and to the examiner's knowledge do not teach or render obvious at least to the skilled artisan the instant invention regarding adjusting the temperature in a fuel cell by varying a rate of coolant evaporation in the cathode compartment by adjusting either the flow rate of the liquid coolant/fuel mixture or pressure in the cathode compartment.

In Van Dine et al., while the patentees' teach a fuel cell system in which an anode-to-cathode cross-over of coolant (such as a water and methanol mixture) cools the fuel cell via line or offtake [36] evaporating water from the anode compartment, there is no teaching or suggestion of adjusting or setting and maintaining the fuel cell operating temperature. Instead, the water balance and subsequent cooling of the fuel cell allows for the fuel cell stack "to operate at higher temperatures so as to improve the voltage output of the power plant" within a wide range of 160° to 1700° C. (col. 3 line 1-5, col. 4 line 17)

Hornburg et al., while relied upon in the prior Office Action to teach or at least suggest cooling of the anode compartment, does not teach or suggest *evaporative* cooling in the cathode compartment and adjusting a desired value thereof by adjusting a flow rate of the liquid coolant mixture or pressure in the cathode compartment.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

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fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian A. Mercado whose telephone number is (703) 305-0511. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (703) 308-2383. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



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